

## SHADOW - Hauptergebnis

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili

### Voraussetzungen für Berechnung des Schattenwurfs

Beschattungsbereich der WEA  
Schatten nur relevant, wo Rotorblatt mind. 20% der Sonne verdeckt  
Siehe WEA-Tabelle

Minimale relevante Sonnenhöhe über Horizont 3 °  
Tage zwischen Berechnungen 1 Tag(e)  
Berechnungszeitsprung 1 Minuten

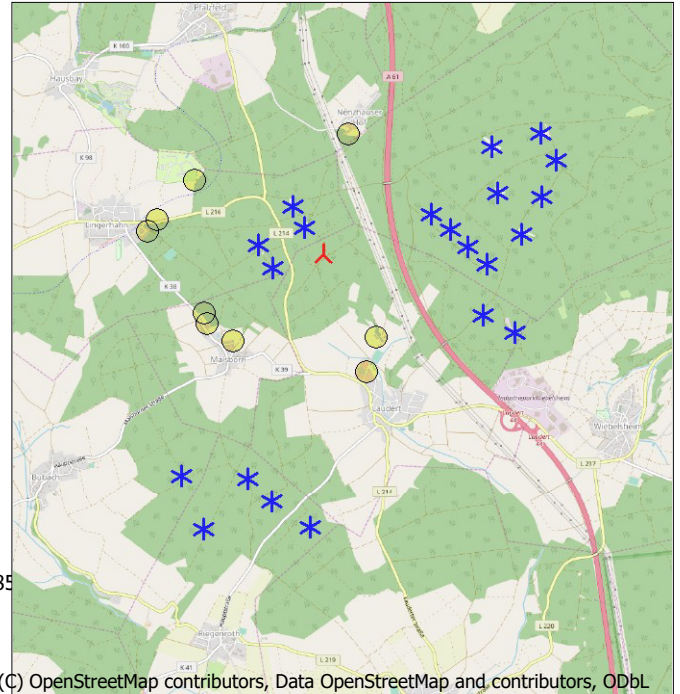
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]  
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsstunden ermittelt aus WEA in Berechnung und Windverteilung:  
Laudert III

Betriebsdauer je Sektor  
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Eine WEA wird nicht berücksichtigt, wenn sie von keinem Teil der Rezeptorfläche aus sichtbar ist. Die Sichtbarkeitsberechnung basiert auf den folgenden Annahmen:  
Verwendete Höhenlinien: Höhenraster-Objekt: Kisselbach\_EMDGrid\_1.wpg (85)  
Hindernisse in Berechnung nicht verwendet  
Berechnungshöhe ü.Gr. für Karte: 1,5 m  
Rasterauflösung: 1,0 m

Alle Koordinatenangaben in:  
ETRS 89 Zone: 32



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Maßstab 1:75.000  
▲ Neue WEA    \* Existierende WEA    ● Schattenrezeptor

### WEA

	X(Ost)	Y(Nord)	Z	Beschreibung	Aktuell	WEA-Typ			Nennleistung	Rotordurchmesser	Nabenhöhe	Schattendaten	
						Hersteller	Typ					Beschatt.-Bereich	U/min
	[m]							[kW]	[m]	[m]	[m]	[U/min]	
Laudert_W431	401.031	5.549.085	531,6	ENERCON E-...	Ja	ENERCON	E-101-3.050	3.050	101,0	135,4	2.040	19,5	
Laudert_W537	401.352	5.548.913	535,6	ENERCON E-...	Ja	ENERCON	E-101-3.050	3.050	101,0	135,4	2.040	19,5	
Li_W332	399.159	5.550.204	518,9	REpower MM...	Ja	REpower	MM 92 Evolution-2.050	2.050	92,5	100,0	1.625	15,0	
Li_W333	398.815	5.549.829	508,2	REpower MM...	Ja	REpower	MM 92 Evolution-2.050	2.050	92,5	100,0	1.625	15,0	
Li_W334	398.960	5.549.593	515,8	REpower MM...	Ja	REpower	MM 92 Evolution-2.050	2.050	92,5	100,0	1.625	15,0	
Li_W348	399.286	5.549.990	524,0	REpower MM...	Ja	REpower	MM 92 Evolution-2.050	2.050	92,5	100,0	1.625	15,0	
Oberwe III_W510	401.643	5.550.876	554,1	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe III_W511	401.151	5.550.744	546,7	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe III_W512	401.788	5.550.607	552,5	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe III_W513	401.205	5.550.293	541,3	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe III_W514	401.644	5.550.247	555,7	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe III_W515	401.425	5.549.880	547,3	REpower 3.4...	Ja	REpower	3.4M104-3.400	3.400	104,0	128,0	1.712	13,8	
Oberwe_W321	400.904	5.549.759	528,7	ENERCON E-...	Ja	ENERCON	E-82-2.300	2.300	82,0	138,4	1.599	18,0	
Oberwe_W322	400.728	5.549.933	523,1	ENERCON E-...	Ja	ENERCON	E-82-2.300	2.300	82,0	138,4	1.599	18,0	
Oberwe_W323	400.543	5.550.103	525,0	ENERCON E-...	Ja	ENERCON	E-82-2.300	2.300	82,0	138,4	1.599	18,0	
Oberwe_W324	401.084	5.549.591	533,3	ENERCON E-...	Ja	ENERCON	E-82-2.300	2.300	82,0	138,4	1.599	18,0	
Ri_W435	398.010	5.547.551	480,8	REpower 3.2...	Ja	REpower	3.2M114-3.170	3.170	114,0	143,0	2.500	0,0	
Ri_W436	398.676	5.547.516	467,6	REpower 3.2...	Ja	REpower	3.2M114-3.170	3.170	114,0	143,0	2.500	0,0	
Ri_W437	398.215	5.547.024	456,3	REpower 3.2...	Ja	REpower	3.2M114-3.170	3.170	114,0	143,0	2.500	0,0	
Ri_W438	398.896	5.547.271	468,9	REpower 3.2...	Ja	REpower	3.2M114-3.170	3.170	114,0	143,0	2.500	0,0	
Ri_W439	399.272	5.547.013	465,9	REpower 3.2...	Ja	REpower	3.2M114-3.170	3.170	114,0	143,0	2.500	0,0	
WEA 01	399.461	5.549.711	518,7	VESTAS V15...	Ja	VESTAS	V150-5.6MW-5.600	5.600	150,0	166,0	1.897	0,0	

### Schattenrezeptor-Eingabe

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr.
		[m]	[m]	[m]	[m]	[m]	[m]	[°]		[m]
IO 01	Nenzhäuserhof 2, 56291 Pfalzfeld	399.725	5.550.899	518,3	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 02	Simmerbach, 56291 Laudert	399.969	5.548.889	481,6	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0

(Fortsetzung nächste Seite)...

## SHADOW - Hauptergebnis

### Berechnung: 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili

...(Fortsetzung von letzter Seite)

Nr.	Name	X(Ost)	Y(Nord)	Z	Breite	Höhe	Höhe ü.Gr.	Neigung des Fensters	Ausrichtungsmodus	Augenhöhe (ZVI) ü.Gr. [m]
IO 03	Horst-Uhlig-Straße 4, 56291 Laudert	399.875	5.548.540	475,0	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 04	Im Hopfengarten 11, 56291 Maisborn	398.556	5.548.876	513,6	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 05	Wohnplatz Sägewerk 2, 56291 Maisborn	398.290	5.549.045	506,8	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 06	Wohnplatz Sägewerk 1, 56291 Maisborn	398.270	5.549.157	510,4	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 07	Stierwiese 7, 56291 Lingerhahn	397.723	5.549.975	483,9	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 08	Hauptstraße 2, 56291 Lingerhahn	397.823	5.550.083	485,5	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0
IO 09	Campingplatz Am Mühlenteich, 56291 Lingerhahn	398.194	5.550.477	467,0	1,0	1,0	1,0	90,0	"Gewächshaus-Modus"	2,0

## Berechnungsergebnisse

Schattenrezeptor

Nr.	Name	astron. max. mögl. Beschattungsdauer			met. wahrsch. Beschattungsdauer	
		Stunden/Jahr [h/a]	Schattentage/Jahr [d/a]	Max.Schattendauer/Tag [h/d]	Stunden/Jahr [h/a]	
IO 01	Nenzhäuserhof 2, 56291 Pfalzfeld	33:55	121	0:24	3:56	
IO 02	Simmerbach, 56291 Laudert	0:00	0	0:00	0:00	
IO 03	Horst-Uhlig-Straße 4, 56291 Laudert	38:07	169	0:20	8:10	
IO 04	Im Hopfengarten 11, 56291 Maisborn	0:00	0	0:00	0:00	
IO 05	Wohnplatz Sägewerk 2, 56291 Maisborn	13:37	42	0:24	3:45	
IO 06	Wohnplatz Sägewerk 1, 56291 Maisborn	32:08	73	0:35	9:13	
IO 07	Stierwiese 7, 56291 Lingerhahn	20:04	88	0:23	4:10	
IO 08	Hauptstraße 2, 56291 Lingerhahn	23:23	96	0:26	4:20	
IO 09	Campingplatz Am Mühlenteich, 56291 Lingerhahn	53:39	163	0:31	5:32	

Gesamtmenge der max. mögl. Beschattung an Rezeptoren pro WEA

Nr.	Name	Maximal [h/a]	Erwartet [h/a]
Laudert_W431	ENERCON E-101 3050 101.0 !O! NH: 135,4 m (Ges:185,9 m) (752)	15:36	4:22
Laudert_W537	ENERCON E-101 3050 101.0 !O! NH: 135,4 m (Ges:185,9 m) (753)	5:14	1:32
Li_W332	REpower MM 92 Evolution 2050 92.5 !O! NH: 100,0 m (Ges:146,3 m) (764)	29:39	5:01
Li_W333	REpower MM 92 Evolution 2050 92.5 !O! NH: 100,0 m (Ges:146,3 m) (765)	30:37	3:50
Li_W334	REpower MM 92 Evolution 2050 92.5 !O! NH: 100,0 m (Ges:146,3 m) (766)	28:55	3:03
Li_W348	REpower MM 92 Evolution 2050 92.5 !O! NH: 100,0 m (Ges:146,3 m) (767)	12:29	2:18
Oberwe III_W510	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (762)	0:00	0:00
Oberwe III_W511	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (763)	4:44	0:58
Oberwe III_W512	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (761)	0:00	0:00
Oberwe III_W513	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (760)	4:01	0:33
Oberwe III_W514	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (759)	0:00	0:00
Oberwe III_W515	REpower 3.4M104 3400 104.0 !O! NH: 128,0 m (Ges:180,0 m) (758)	0:00	0:00
Oberwe_W321	ENERCON E-82 2300 82.0 !O! NH: 138,4 m (Ges:179,4 m) (754)	0:00	0:00
Oberwe_W322	ENERCON E-82 2300 82.0 !O! NH: 138,4 m (Ges:179,4 m) (755)	7:04	0:32
Oberwe_W323	ENERCON E-82 2300 82.0 !O! NH: 138,4 m (Ges:179,4 m) (756)	8:43	0:40
Oberwe_W324	ENERCON E-82 2300 82.0 !O! NH: 138,4 m (Ges:179,4 m) (757)	0:00	0:00
Ri_W435	REpower 3.2M114 3170 114.0 !O! NH: 143,0 m (Ges:200,0 m) (778)	2:52	0:29
Ri_W436	REpower 3.2M114 3170 114.0 !O! NH: 143,0 m (Ges:200,0 m) (780)	10:58	1:20
Ri_W437	REpower 3.2M114 3170 114.0 !O! NH: 143,0 m (Ges:200,0 m) (779)	5:28	0:35
Ri_W438	REpower 3.2M114 3170 114.0 !O! NH: 143,0 m (Ges:200,0 m) (781)	0:00	0:00
Ri_W439	REpower 3.2M114 3170 114.0 !O! NH: 143,0 m (Ges:200,0 m) (782)	0:00	0:00
WEA 01	VESTAS V150-5.6MW 5600 150.0 !O! NH: 166,0 m (Ges:241,0 m) (493)	62:12	14:54

Summen in Rezeptortabelle und WEA-Tabelle können sich unterscheiden, da eine WEA gleichzeitig an zwei oder mehr Rezeptoren Beschattung verursachen kann und/oder ein Rezeptor gleichzeitig von zwei oder mehr WEA beschattet werden kann.

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bil**Schattenrezeptor:** IO 01 - Nenzhäuserhof 2, 56291 Pfalzfeld  
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:29	15:11 (Li_W332)	08:05			
	16:38	21 15:32 (Li_W332)	17:23			
2	08:29	15:12 (Li_W332)	08:04			
	16:39	21 15:33 (Li_W332)	17:24			
3	08:29	15:13 (Li_W332)	08:02			
	16:40	20 15:33 (Li_W332)	17:26			
4	08:29	15:14 (Li_W332)	08:01			
	16:41	19 15:33 (Li_W332)	17:28			
5	08:29	15:14 (Li_W332)	07:59			
	16:42	19 15:33 (Li_W332)	17:30			
6	08:29	09:07 (Oberwe_W322)	07:58			
	16:43	22 15:33 (Li_W332)	17:31			
7	08:28	09:06 (Oberwe_W322)	07:56			
	16:44	23 15:33 (Li_W332)	17:33			
8	08:28	09:05 (Oberwe_W322)	07:55			
	16:46	24 15:32 (Li_W332)	17:35			
9	08:27	09:06 (Oberwe_W322)	07:53			
	16:47	23 15:32 (Li_W332)	17:36			
10	08:27	09:05 (Oberwe_W322)	07:51			
	16:48	21 15:31 (Li_W332)	17:38			
11	08:27	09:05 (Oberwe_W322)	07:50			
	16:50	18 15:29 (Li_W332)	17:40			
12	08:26	09:05 (Oberwe_W322)	07:48			
	16:51	15 09:20 (Oberwe_W323)	17:42			
13	08:25	09:05 (Oberwe_W322)	07:46			
	16:52	16 09:21 (Oberwe_W323)	17:43			
14	08:25	09:05 (Oberwe_W322)	07:44			
	16:54	17 09:22 (Oberwe_W323)	17:45			
15	08:24	09:05 (Oberwe_W322)	07:43			
	16:55	18 09:23 (Oberwe_W323)	17:47			
16	08:23	09:05 (Oberwe_W322)	07:41			
	16:57	19 09:24 (Oberwe_W323)	17:49			
17	08:22	09:06 (Oberwe_W322)	07:39			
	16:58	19 09:25 (Oberwe_W323)	17:50			
18	08:22	09:06 (Oberwe_W322)	07:37			
	17:00	19 09:25 (Oberwe_W323)	17:52			
19	08:21	09:07 (Oberwe_W322)	07:35			
	17:01	19 09:26 (Oberwe_W323)	17:54			
20	08:20	09:07 (Oberwe_W322)	07:33			
	17:03	20 09:27 (Oberwe_W323)	17:55			
21	08:19	09:08 (Oberwe_W322)	07:31			
	17:04	19 09:27 (Oberwe_W323)	17:57			
22	08:18	09:10 (Oberwe_W322)	07:29			
	17:06	18 09:28 (Oberwe_W323)	17:59			
23	08:17	09:11 (Oberwe_W322)	07:28			
	17:08	17 09:28 (Oberwe_W323)	18:01			
24	08:16	09:10 (Oberwe_W322)	07:26			
	17:09	17 09:27 (Oberwe_W323)	18:02			
25	08:14	09:11 (Oberwe_W322)	07:24			
	17:11	16 09:27 (Oberwe_W323)	18:04			
26	08:13	09:13 (Oberwe_W322)	07:22			
	17:12	14 09:27 (Oberwe_W323)	18:06			
27	08:12	09:13 (Oberwe_W322)	07:20			
	17:14	13 09:26 (Oberwe_W323)	18:07			
28	08:11	09:15 (Oberwe_W322)	07:18			
	17:16	10 09:25 (Oberwe_W323)	18:09			
29	08:09	09:17 (Oberwe_W322)				
	17:18	7 09:24 (Oberwe_W323)				
30	08:08					
	17:19					
31	08:07					
	17:21					
	Sonnenscheinstunden	267	281		413	489
	astr.max.mögl.Beschattung	524	110	152		
	Red.Sonnenscheinwahrsch.	0,17	0,29	0,32		
	Reduktion Betriebsdauer	0,91	0,91	0,91		
	Reduktion Windrichtung	0,56	0,55	0,62		
	Gesamte Reduktion	0,09	0,15	0,18		
	Met.wahrsch.Beschattung	47	16	28		

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

Projekt:

# Laudert III

Lizenzierter Anwender:

**Juwi AG**  
Energie-Allee 1  
DE-55286 Wörrstadt

Bianca Liersch / bianca.liersch@juwi.de  
Berechnet:  
30.04.2020 13:31/3.3.274

## SHADOW - Kalender

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bil**Schattenrezeptor:** IO 01 - Nenzhäuserhof 2, 56291 Pfalzfeld  
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:24	05:58	06:43	07:29	07:19	08:06
	21:43	21:14	20:16	19:11	17:08	16:31
2	05:25	05:59	06:45	07:30	07:20	08:07
	21:43	21:13	20:14	19:08	17:07	16:31
3	05:25	06:00	06:46	07:32	07:22	08:09
	21:43	21:11	20:12	19:06	17:05	16:30
4	05:26	06:02	06:48	07:33	07:24	08:10
	21:42	21:10	20:10	19:04	17:03	16:30
5	05:27	06:03	06:49	07:35	07:25	08:11
	21:42	21:08	20:08	19:02	17:02	16:29
6	05:27	06:05	06:51	07:36	07:27	08:13
	21:42	21:06	20:06	19:00	17:00	16:29
7	05:28	06:06	06:52	07:38	07:29	08:14
	21:41	21:05	20:03	18:58	16:58	16:29
8	05:29	06:08	06:54	07:40	07:30	08:15
	21:40	21:03	20:01	18:55	16:57	16:28
9	05:30	06:09	06:55	07:41	07:32	08:16
	21:40	21:01	19:59	18:53	16:55	16:28
10	05:31	06:11	06:57	07:43	07:34	08:17
	21:39	21:00	19:57	18:51	16:54	16:28
11	05:32	06:12	06:58	07:44	07:35	08:18
	21:38	20:58	19:55	18:49	16:52	16:28
12	05:33	06:14	07:00	07:46	07:37	08:19
	21:38	20:56	19:52	18:47	16:51	16:28
13	05:34	06:15	07:01	07:47	07:39	08:20
	21:37	20:54	19:50	18:45	16:50	16:28
14	05:35	06:17	07:03	07:49	07:40	08:21
	21:36	20:52	19:48	18:43	16:48	16:28
15	05:36	06:18	07:04	07:51	07:42	08:22
	21:35	20:50	19:46	18:41	16:47	16:28
16	05:37	06:20	07:06	07:52	07:43	08:23
	21:34	20:49	19:44	18:39	16:46	16:28
17	05:38	06:21	07:07	07:54	07:45	08:23
	21:33	20:47	19:41	18:37	16:44	16:28
18	05:39	06:23	07:09	07:55	07:47	08:24
	21:32	20:45	19:39	18:35	16:43	16:28
19	05:41	06:24	07:10	07:57	07:48	08:25
	21:31	20:43	19:37	18:33	16:42	16:28
20	05:42	06:25	07:12	07:59	07:50	08:26
	21:30	20:41	19:35	18:31	16:41	16:28
21	05:43	06:27	07:13	08:00	07:51	08:26
	21:29	20:39	19:33	18:29	16:40	16:30
22	05:44	06:28	07:15	08:02	07:53	08:27
	21:28	20:37	19:30	18:27	16:39	16:30
23	05:46	06:30	07:16	08:04	07:54	08:27
	21:27	20:35	19:28	18:25	16:38	16:31
24	05:47	06:31	07:18	08:05	07:56	08:28
	21:25	20:33	19:26	18:23	16:37	16:31
25	05:48	06:33	07:20	08:07	07:58	08:28
	21:24	20:31	19:24	17:21	16:36	16:32
26	05:49	06:34	07:21	07:09	07:59	08:28
	21:23	20:29	19:21	17:19	16:35	16:32
27	05:51	06:36	07:23	07:10	08:00	08:29
	21:22	20:27	19:19	17:17	16:34	16:33
28	05:52	06:37	07:24	07:12	08:02	08:29
	21:20	20:25	19:17	17:15	16:33	16:34
29	05:54	06:39	07:26	07:14	08:03	08:29
	21:19	20:23	19:15	17:14	16:33	16:35
30	05:55	06:40	07:27	07:15	08:05	08:29
	21:17	20:20	19:13	17:12	16:32	16:36
31	05:56	06:42		07:17		08:29
	21:16	20:18		17:10		16:37
Sonnenscheinstunden	493	449	380	334	273	253
astr.max.mögl.Beschattung			141	122	295	691
Red.Sonnenscheinwahrsch.			0,40	0,26	0,20	0,15
Reduktion Betriebsdauer			0,91	0,91	0,91	0,91
Reduktion Windrichtung			0,62	0,55	0,46	0,74
Gesamte Reduktion			0,23	0,13	0,09	0,10
Met.wahrsch.Beschattung			33	16	25	70

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bil**Schattenrezeptor:** IO 02 - Simmerbach, 56291 Laudert  
**Voraussetzungen für Berechnung des Schattenwurfs** Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
1	08:29	08:05	07:15	07:09	06:08	05:26	05:24	05:58	06:43	07:29	07:18	08:06
	16:38	17:23	18:11	20:01	20:48	21:30	21:43	21:14	20:16	19:11	17:08	16:31
2	08:29	08:04	07:13	07:07	06:06	05:25	05:25	05:59	06:45	07:30	07:20	08:07
	16:39	17:24	18:12	20:02	20:49	21:31	21:43	21:13	20:14	19:08	17:07	16:31
3	08:29	08:02	07:11	07:05	06:04	05:25	05:25	06:01	06:46	07:32	07:22	08:09
	16:40	17:26	18:14	20:04	20:51	21:32	21:43	21:11	20:12	19:06	17:05	16:30
4	08:29	08:01	07:09	07:02	06:03	05:24	05:26	06:02	06:48	07:33	07:23	08:10
	16:41	17:28	18:16	20:05	20:52	21:33	21:42	21:10	20:10	19:04	17:03	16:30
5	08:29	07:59	07:07	07:00	06:01	05:24	05:27	06:03	06:49	07:35	07:25	08:11
	16:42	17:30	18:17	20:07	20:54	21:34	21:42	21:08	20:08	19:02	17:02	16:29
6	08:28	07:58	07:05	06:58	05:59	05:23	05:28	06:05	06:51	07:36	07:27	08:12
	16:43	17:31	18:19	20:09	20:55	21:35	21:41	21:06	20:05	19:00	17:00	16:29
7	08:28	07:56	07:03	06:56	05:58	05:22	05:28	06:06	06:52	07:38	07:28	08:14
	16:44	17:33	18:21	20:10	20:57	21:36	21:41	21:05	20:03	18:58	16:58	16:29
8	08:28	07:55	07:01	06:54	05:56	05:22	05:29	06:08	06:54	07:40	07:30	08:15
	16:46	17:35	18:22	20:12	20:58	21:36	21:40	21:03	20:01	18:55	16:57	16:28
9	08:27	07:53	06:59	06:52	05:54	05:22	05:30	06:09	06:55	07:41	07:32	08:16
	16:47	17:37	18:24	20:13	21:00	21:37	21:40	21:01	19:59	18:53	16:55	16:28
10	08:27	07:51	06:57	06:50	05:53	05:21	05:31	06:11	06:57	07:43	07:33	08:17
	16:48	17:38	18:26	20:15	21:01	21:38	21:39	20:59	19:57	18:51	16:54	16:28
11	08:26	07:50	06:55	06:47	05:51	05:21	05:32	06:12	06:58	07:44	07:35	08:18
	16:50	17:40	18:27	20:16	21:03	21:39	21:38	20:58	19:55	18:49	16:52	16:28
12	08:26	07:48	06:52	06:45	05:50	05:21	05:33	06:14	07:00	07:46	07:37	08:19
	16:51	17:42	18:29	20:18	21:04	21:39	21:38	20:56	19:52	18:47	16:51	16:28
13	08:25	07:46	06:50	06:43	05:48	05:20	05:34	06:15	07:01	07:47	07:38	08:20
	16:52	17:43	18:30	20:20	21:06	21:40	21:37	20:54	19:50	18:45	16:50	16:28
14	08:25	07:44	06:48	06:41	05:47	05:20	05:35	06:17	07:03	07:49	07:40	08:21
	16:54	17:45	18:32	20:21	21:07	21:41	21:36	20:52	19:48	18:43	16:48	16:28
15	08:24	07:43	06:46	06:39	05:45	05:20	05:36	06:18	07:04	07:51	07:42	08:22
	16:55	17:47	18:34	20:23	21:09	21:41	21:35	20:50	19:46	18:41	16:47	16:28
16	08:23	07:41	06:44	06:37	05:44	05:20	05:37	06:20	07:06	07:52	07:43	08:23
	16:57	17:49	18:35	20:24	21:10	21:42	21:34	20:48	19:44	18:39	16:46	16:28
17	08:22	07:39	06:42	06:35	05:42	05:20	05:38	06:21	07:07	07:54	07:45	08:23
	16:58	17:50	18:37	20:26	21:11	21:42	21:33	20:47	19:41	18:37	16:44	16:28
18	08:21	07:37	06:39	06:33	05:41	05:20	05:40	06:23	07:09	07:55	07:47	08:24
	17:00	17:52	18:38	20:27	21:13	21:42	21:32	20:45	19:39	18:35	16:43	16:29
19	08:21	07:35	06:37	06:31	05:40	05:20	05:41	06:24	07:10	07:57	07:48	08:25
	17:01	17:54	18:40	20:29	21:14	21:43	21:31	20:43	19:37	18:33	16:42	16:29
20	08:20	07:33	06:35	06:29	05:38	05:20	05:42	06:26	07:12	07:59	07:50	08:25
	17:03	17:55	18:42	20:31	21:16	21:43	21:30	20:41	19:35	18:31	16:41	16:29
21	08:19	07:31	06:33	06:27	05:37	05:20	05:43	06:27	07:13	08:00	07:51	08:26
	17:04	17:57	18:43	20:32	21:17	21:43	21:29	20:39	19:33	18:29	16:40	16:30
22	08:18	07:29	06:31	06:25	05:36	05:20	05:44	06:29	07:15	08:02	07:53	08:27
	17:06	17:59	18:45	20:34	21:18	21:44	21:28	20:37	19:30	18:27	16:39	16:30
23	08:17	07:27	06:28	06:23	05:35	05:21	05:46	06:30	07:16	08:04	07:54	08:27
	17:08	18:01	18:46	20:35	21:19	21:44	21:27	20:35	19:28	18:25	16:38	16:31
24	08:15	07:26	06:26	06:21	05:34	05:21	05:47	06:32	07:18	08:05	07:56	08:27
	17:09	18:02	18:48	20:37	21:21	21:44	21:25	20:33	19:26	18:23	16:37	16:31
25	08:14	07:24	06:24	06:19	05:33	05:21	05:48	06:33	07:19	07:07	07:57	08:28
	17:11	18:04	18:50	20:38	21:22	21:44	21:24	20:31	19:24	17:21	16:36	16:32
26	08:13	07:22	06:22	06:17	05:32	05:21	05:50	06:34	07:21	07:08	07:59	08:28
	17:13	18:06	18:51	20:40	21:23	21:44	21:23	20:29	19:21	17:19	16:35	16:32
27	08:12	07:20	06:20	06:15	05:31	05:22	05:51	06:36	07:23	07:10	08:00	08:28
	17:14	18:07	18:53	20:42	21:24	21:44	21:21	20:27	19:19	17:17	16:34	16:33
28	08:11	07:18	06:18	06:13	05:30	05:22	05:52	06:37	07:24	07:12	08:02	08:29
	17:16	18:09	18:54	20:43	21:26	21:44	21:20	20:25	19:17	17:15	16:33	16:34
29	08:09		07:15	06:12	05:29	05:23	05:54	06:39	07:26	07:13	08:03	08:29
	17:18		19:56	20:45	21:27	21:44	21:19	20:23	19:15	17:14	16:33	16:35
30	08:08		07:13	06:10	05:28	05:23	05:55	06:40	07:27	07:15	08:05	08:29
	17:19		19:58	20:46	21:28	21:43	21:17	20:20	19:13	17:12	16:32	16:36
31	08:07		07:11		05:27		05:56	06:42		07:17		08:29
	17:21		19:59		21:29		21:16	20:18		17:10		16:37
Sonneneinstunden	267	282	368	412	478	489	493	448	380	334	273	253
astr.max.mögl.Beschattung												
Red.Sonneneinwahrsch.												
Reduktion Betriebsdauer												
Reduktion Windrichtung												
Gesamte Reduktion												
Met.wahrsch.Beschattung												

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat    Sonnenaufgang (SS:MM)    Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)  
 Sonnenuntergang (SS:MM)    Minuten mit Schatten    Zeitpunkt (SS:MM) Schatteneende (WEA mit letztem Schatten)

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**Schattenrezeptor:** IO 03 - Horst-Uhlig-Straße 4, 56291 Laudert  
**Voraussetzungen für Berechnung des Schattenwurfs** Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni	
1   08:29	15:55 (Ri_W437)   08:05		07:15	07:09	06:08	05:26	
1   16:38	16:05 (Ri_W436)   17:23		18:11	20:01	20:48	17   06:34 (Laudert_W431)	
2   08:29	15:55 (Ri_W437)   08:04		07:13	07:07	06:06	17   06:34 (Laudert_W431)	
1   16:39	16:06 (Ri_W436)   17:24		18:12	20:02	20:49	16   07:05 (Laudert_W537)   21:31	
3   08:29	15:56 (Ri_W437)   08:02		07:11	07:05	06:04	18   06:35 (Laudert_W431)	
1   16:40	16:07 (Ri_W436)   17:26		18:14	20:04	20:51	15   07:05 (Laudert_W537)   21:32	
4   08:29	15:57 (Ri_W437)   08:01	16:57 (Ri_W435)   07:09	07:02	06:03	06:50 (Laudert_W537)   21:34	18   06:35 (Laudert_W431)	
1   16:41	16:09 (Ri_W436)   17:28	2   16:59 (Ri_W435)   07:09	20:05	20:52	15   07:05 (Laudert_W537)   21:33	19   06:35 (Laudert_W431)	
5   08:29	15:57 (Ri_W437)   07:59	16:57 (Ri_W435)   07:07	07:00	06:01	06:51 (Laudert_W537)   21:34	18   06:35 (Laudert_W431)	
1   16:42	16:09 (Ri_W436)   17:30	5   17:02 (Ri_W435)   07:05	20:07	20:54	14   07:05 (Laudert_W537)   21:34	19   06:36 (Laudert_W431)	
6   08:28	15:59 (Ri_W437)   07:58	16:55 (Ri_W435)   07:05	06:58	06:59	06:51 (Laudert_W537)   21:34	19   06:36 (Laudert_W431)	
1   16:43	16:11 (Ri_W436)   17:31	8   17:03 (Ri_W435)   07:03	20:09	20:55	12   07:03 (Laudert_W537)   21:35	19   06:35 (Laudert_W431)	
7   08:28	15:59 (Ri_W436)   07:56	16:55 (Ri_W435)   07:03	06:56	06:58	06:52 (Laudert_W537)   21:35	19   06:36 (Laudert_W431)	
1   16:44	16:12 (Ri_W436)   17:33	10   17:05 (Ri_W435)   07:01	20:10	20:57	10   07:02 (Laudert_W537)   21:36	19   06:36 (Laudert_W431)	
8   08:28	16:00 (Ri_W436)   07:55	16:55 (Ri_W435)   07:01	06:54	06:56	06:54 (Laudert_W537)   21:36	19   06:37 (Laudert_W431)	
1   16:46	16:14 (Ri_W436)   17:35	13   17:08 (Ri_W435)   07:00	20:12	20:58	6   07:00 (Laudert_W537)   21:36	20   06:37 (Laudert_W431)	
9   08:27	15:59 (Ri_W436)   07:53	16:55 (Ri_W435)   06:59	06:52	06:54	06:54 (Laudert_W537)   21:36	20   06:37 (Laudert_W431)	
1   16:47	16:15 (Ri_W436)   17:37	13   17:08 (Ri_W435)   07:00	20:13	21:00	05:52	19   06:36 (Laudert_W431)	
10   08:27	16:00 (Ri_W436)   07:51	16:55 (Ri_W435)   06:57	06:50	05:53	05:21	19   06:36 (Laudert_W431)	
1   16:48	16:16 (Ri_W436)   17:38	12   17:07 (Ri_W435)   06:55	20:15	21:01	05:21	20   06:37 (Laudert_W431)	
11   08:26	16:00 (Ri_W436)   07:50	16:56 (Ri_W435)   06:55	06:47	05:21	05:21	20   06:37 (Laudert_W431)	
1   16:50	16:17 (Ri_W436)   17:40	11   17:07 (Ri_W435)   06:55	20:16	21:03	05:21	19   06:37 (Laudert_W431)	
12   08:26	16:00 (Ri_W436)   07:48	16:58 (Ri_W435)   06:52	06:45	05:20	05:20	19   06:37 (Laudert_W431)	
1   16:51	16:17 (Ri_W436)   17:42	8   17:06 (Ri_W435)   06:52	20:18	21:04	05:20	20   06:38 (Laudert_W431)	
13   08:25	16:01 (Ri_W436)   07:46	17:00 (Ri_W435)   06:50	06:43	05:48	05:20	20   06:38 (Laudert_W431)	
1   16:52	16:18 (Ri_W436)   17:43	3   17:03 (Ri_W435)   06:48	20:20	21:06	05:20	20   06:37 (Laudert_W431)	
14   08:25	16:01 (Ri_W436)   07:44	06:48	06:41	05:47	05:20	20   06:37 (Laudert_W431)	
1   16:54	16:19 (Ri_W436)   17:45	18:32	20:21	21:07	05:20	19   06:37 (Laudert_W431)	
15   08:24	16:01 (Ri_W436)   07:43	06:46	06:39	05:45	05:20	20   06:38 (Laudert_W431)	
1   16:55	16:19 (Ri_W436)   17:47	18:34	20:23	21:09	05:20	20   06:38 (Laudert_W431)	
16   08:23	16:01 (Ri_W436)   07:41	06:44	06:37	05:44	05:20	20   06:38 (Laudert_W431)	
1   16:57	16:19 (Ri_W436)   17:49	18:35	20:24	21:10	05:20	20   06:38 (Laudert_W431)	
17   08:22	16:02 (Ri_W436)   07:39	06:42	06:35	05:42	05:20	20   06:38 (Laudert_W431)	
1   16:58	16:19 (Ri_W436)   17:50	18:37	20:26	21:11	05:20	20   06:38 (Laudert_W431)	
18   08:21	16:02 (Ri_W436)   07:37	06:39	06:33	05:41	05:20	19   06:38 (Laudert_W431)	
1   17:00	16:19 (Ri_W436)   17:52	18:38	20:27	21:13	05:20	19   06:38 (Laudert_W431)	
19   08:21	16:03 (Ri_W436)   07:35	06:37	06:31	05:40	05:20	19   06:38 (Laudert_W431)	
1   17:01	16:19 (Ri_W436)   17:54	18:40	20:29	21:14	05:20	19   06:38 (Laudert_W431)	
20   08:20	16:04 (Ri_W436)   07:33	06:35	06:29	05:39	05:20	19   06:38 (Laudert_W431)	
1   17:03	16:19 (Ri_W436)   17:55	18:42	20:31	21:16	05:20	19   06:38 (Laudert_W431)	
21   08:19	16:04 (Ri_W436)   07:31	06:33	06:27	05:37	05:20	19   06:38 (Laudert_W431)	
1   17:04	16:19 (Ri_W436)   17:57	18:43	20:32	21:17	05:20	19   06:39 (Laudert_W431)	
22   08:18	16:06 (Ri_W436)   07:29	06:31	06:25	05:36	05:20	19   06:39 (Laudert_W431)	
1   17:06	16:19 (Ri_W436)   17:59	18:45	20:34	21:18	05:20	19   06:39 (Laudert_W431)	
23   08:17	16:07 (Ri_W436)   07:27	06:28	06:23	05:35	05:21	19   06:39 (Laudert_W431)	
1   17:08	16:19 (Ri_W436)   18:01	18:46	20:35	21:19	05:21	19   06:39 (Laudert_W431)	
24   08:15	16:08 (Ri_W436)   07:26	06:26	06:21	05:34	05:21	19   06:21 (Laudert_W431)	
1   17:09	16:17 (Ri_W436)   18:02	18:48	20:37	21:21	05:21	19   06:40 (Laudert_W431)	
25   08:14	16:12 (Ri_W436)   07:24	06:24	06:19	05:33	05:21	20   06:20 (Laudert_W431)	
1   17:11	16:14 (Ri_W436)   18:04	18:50	20:38	21:22	05:21	20   06:40 (Laudert_W431)	
26   08:13	07:22	06:22	06:17	05:32	05:22	20   06:20 (Laudert_W431)	
1   17:13	18:06	18:51	20:40	4   07:01 (Laudert_W537)   21:23	6   06:22 (Laudert_W431)   21:44	20   06:40 (Laudert_W431)	
27   08:12	07:20	06:20	06:15	06:54 (Laudert_W537)   05:31	06:20 (Laudert_W431)   05:22	20   06:21 (Laudert_W431)	
1   17:14	18:07	18:53	20:42	9   07:03 (Laudert_W537)   21:24	10   06:30 (Laudert_W431)   21:44	20   06:41 (Laudert_W431)	
28   08:11	07:18	06:18	06:13	06:52 (Laudert_W537)   05:30	06:19 (Laudert_W431)   05:22	20   06:21 (Laudert_W431)	
1   17:16	18:09	18:54	20:43	12   07:04 (Laudert_W537)   21:26	12   06:31 (Laudert_W431)   21:44	19   06:40 (Laudert_W431)	
29   08:09		07:15	06:12	06:51 (Laudert_W537)   05:29	06:18 (Laudert_W431)   05:23	20   06:21 (Laudert_W431)	
1   17:18		19:56	20:45	14   07:05 (Laudert_W537)   21:27	13   06:31 (Laudert_W431)   21:44	20   06:41 (Laudert_W431)	
30   08:08		07:13	06:10	06:50 (Laudert_W537)   05:28	06:18 (Laudert_W431)   05:23	20   06:21 (Laudert_W431)	
1   17:19		19:58	20:46	15   07:05 (Laudert_W537)   21:28	15   06:33 (Laudert_W431)   21:43	20   06:41 (Laudert_W431)	
31   08:07		07:11		05:27	06:18 (Laudert_W431)		
1   17:21		19:59		21:29	15   06:33 (Laudert_W431)		
Sonnenscheinstunden	267	282	368	412	478	489	578
astr.max.mögl.Beschattung	348	85		54	174		0,38
Red.Sonnenscheinwahrsch.	0,17	0,29		0,40	0,45		0,91
Reduktion Betriebsdauer	0,91	0,91		0,91	0,91		0,75
Reduktion Windrichtung	0,76	0,75		0,70	0,72		0,26
Gesamte Reduktion	0,12	0,20		0,26	0,30		0,151
Met.wahrsch.Beschattung	42	17		14	52		

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM)	Schattenanfang (WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Schattenende (WEA mit letztem Schatten)



Projekt:

Laudert III

Lizenzierter Anwender:

Juwit AG
Energie-Allee 1
DE-55286 Wörrstadt

Bianca Liersch / bianca.liersch@juwi.de
Berechnet:
30.04.2020 13:31/3.3.274

SHADOW - Kalender

Berechnung: 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili Schattenrezeptor: IO 04 - Im Hopfengarten 11, 56291 Maisborn
Voraussetzungen für Berechnung des Schattenwurfs Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

Table with 13 columns (N, NNO, ONO, O, OSO, SSO, S, SSW, WSW, W, WNW, NNW, Summe) and 2 rows of data.

Main shadow calculation table with columns for months (Januar to Dezember) and rows for individual days (1 to 31) and summary rows (Sonneneinstunden, astr.max.mögl.Beschattung, etc.).

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Summary table with columns: Tag im Monat, Sonnenaufgang (SS:MM), Sonnenuntergang (SS:MM), Minuten mit Schatten, Zeitpunkt (SS:MM) Schattenanfang, Zeitpunkt (SS:MM) Schattenende, (WEA mit erstem Schatten), (WEA mit letztem Schatten).



SHADOW - Kalender

Berechnung: 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili Schattenrezeptor: IO 05 - Wohnplatz Sägewerk 2, 56291 Maisborn
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Table with columns for months (Januar to Dezember) and rows for each day of the year (1 to 31), showing sunrise and sunset times and shadow data.

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Tag im Monat Sonnenaufgang (SS:MM) Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)
Sonnenuntergang (SS:MM) Minuten mit Schatten Zeitpunkt (SS:MM) Schatteneende (WEA mit letztem Schatten)



**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**Schattenrezeptor:** IO 07 - Stierwiese 7, 56291 Lingerhahn  
**Voraussetzungen für Berechnung des Schattenwurfs** Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März		April		Mai	Juni
1	08:29 16:38	08:05 17:23	07:16 18:11	7	07:43 (Li_W334)   07:09 07:50 (Li_W334)   20:01	14	07:35 (Li_W348)   06:08 07:49 (Li_W348)   20:48	05:26 21:30
2	08:29 16:39	08:04 17:24	07:14 18:12	11	07:41 (Li_W334)   07:07 07:52 (Li_W334)   20:02	14	07:35 (Li_W348)   06:06 07:49 (Li_W348)   20:49	05:26 21:31
3	08:29 16:40	08:03 17:26	07:12 18:14	14	07:39 (Li_W334)   07:05 07:53 (Li_W334)   20:04	13	07:34 (Li_W348)   06:04 07:47 (Li_W348)   20:51	05:25 21:32
4	08:29 16:41	08:01 17:28	07:09 18:16	16	07:38 (Li_W334)   07:02 07:54 (Li_W334)   20:06	13	07:34 (Li_W348)   06:03 07:47 (Li_W348)   20:52	05:24 21:33
5	08:29 16:42	08:00 17:30	07:07 18:17	16	07:38 (Li_W334)   07:00 07:54 (Li_W334)   20:07	10	07:35 (Li_W348)   06:01 07:45 (Li_W348)   20:54	05:24 21:34
6	08:29 16:43	07:58 17:31	07:05 18:19	16	07:37 (Li_W334)   06:58 07:53 (Li_W334)   20:09	6	07:37 (Li_W348)   05:59 07:43 (Li_W348)   20:56	05:23 21:35
7	08:28 16:45	07:56 17:33	07:03 18:21	16	07:37 (Li_W334)   06:56 07:53 (Li_W334)   20:10		05:58 20:57	05:22 21:36
8	08:28 16:46	07:55 17:35	07:01 18:22	15	07:37 (Li_W334)   06:54 07:52 (Li_W334)   20:12		05:56 20:59	05:22 21:37
9	08:28 16:47	07:53 17:37	06:59 18:24	13	07:38 (Li_W334)   06:52 07:51 (Li_W334)   20:13		05:54 21:00	05:22 21:37
10	08:27 16:48	07:51 17:38	06:57 18:26	11	07:39 (Li_W334)   06:50 07:50 (Li_W334)   20:15		05:53 21:02	05:21 21:38
11	08:27 16:50	07:50 17:40	06:55 18:27	4	07:42 (Li_W334)   06:48 07:46 (Li_W334)   20:17		05:51 21:03	05:21 21:39
12	08:26 16:51	07:48 17:42	06:53 18:29		06:45 20:18		05:50 21:04	05:21 21:40
13	08:25 16:52	07:46 17:44	06:50 18:31		06:43 20:20	8	07:08 (Li_W332)   05:48 07:16 (Li_W332)   21:06	05:20 21:40
14	08:25 16:54	07:45 17:45	06:48 18:32		06:41 20:21	12	07:06 (Li_W332)   05:47 07:18 (Li_W332)   21:07	05:20 21:41
15	08:24 16:55	07:43 17:47	06:46 18:34	7	07:15 (WEA 01)   06:39 07:22 (WEA 01)   20:23	13	07:05 (Li_W332)   05:45 07:18 (Li_W332)   21:09	05:20 21:41
16	08:23 16:57	07:41 17:49	06:44 18:35	13	07:12 (WEA 01)   06:37 07:25 (WEA 01)   20:24	14	07:04 (Li_W332)   05:44 07:18 (Li_W332)   21:10	05:20 21:42
17	08:22 16:58	07:39 17:50	06:42 18:37	16	07:10 (Li_W333)   06:35 07:26 (WEA 01)   20:26	15	07:03 (Li_W332)   05:43 07:18 (Li_W332)   21:12	05:20 21:42
18	08:22 17:00	07:37 17:52	06:40 18:39	19	07:07 (Li_W333)   06:33 07:26 (WEA 01)   20:28	15	07:03 (Li_W332)   05:41 07:18 (Li_W332)   21:13	05:20 21:43
19	08:21 17:01	07:35 17:54	06:37 18:40	21	07:06 (Li_W333)   06:31 07:27 (WEA 01)   20:29	14	07:03 (Li_W332)   05:40 07:17 (Li_W332)   21:14	05:20 21:43
20	08:20 17:03	07:33 17:56	06:35 18:42	22	07:05 (Li_W333)   06:29 07:27 (WEA 01)   20:31	12	07:04 (Li_W332)   05:39 07:16 (Li_W332)   21:16	05:20 21:43
21	08:19 17:05	07:32 17:57	06:33 18:43	23	07:04 (Li_W333)   06:27 07:27 (WEA 01)   20:32	10	07:05 (Li_W332)   05:37 07:15 (Li_W332)   21:17	05:20 21:43
22	08:18 17:06	07:30 17:59	06:31 18:45	22	07:04 (Li_W333)   06:25 07:26 (WEA 01)   20:34	7	07:07 (Li_W332)   05:36 07:14 (Li_W332)   21:18	05:20 21:44
23	08:17 17:08	07:28 18:01	06:29 18:47	22	07:03 (Li_W333)   06:23 07:25 (WEA 01)   20:35		05:35 21:20	05:21 21:44
24	08:16 17:09	07:26 18:02	06:26 18:48	21	07:03 (Li_W333)   06:21 07:24 (WEA 01)   20:37		05:34 21:21	05:21 21:44
25	08:14 17:11	07:24 18:04	06:24 18:50	20	07:03 (Li_W333)   06:19 07:23 (WEA 01)   20:39		05:33 21:22	05:21 21:44
26	08:13 17:13	07:22 18:06	06:22 18:51	17	07:04 (Li_W333)   06:17 07:21 (WEA 01)   20:40		05:32 21:23	05:22 21:44
27	08:12 17:14	07:20 18:07	06:20 18:53	12	07:06 (Li_W333)   06:15 07:18 (Li_W333)   20:42		05:31 21:25	05:22 21:44
28	08:11 17:16	07:18 18:09	06:18 18:55	7	07:07 (Li_W333)   06:14 07:14 (Li_W333)   20:43		05:30 21:26	05:22 21:44
29	08:10 17:18		07:15 19:56	5	07:14 (Li_W333)   06:12 07:40 (Li_W348)   20:45		05:29 21:27	05:23 21:44
30	08:08 17:19		07:13 19:58	10	07:37 (Li_W348)   06:10 07:47 (Li_W348)   20:46		05:28 21:28	05:24 21:44
31	08:07 17:21		07:11 19:59	12	07:36 (Li_W348)   07:48 (Li_W348)		05:27 21:29	
Sonnenscheinstunden	267	281	368		413		478	489
astr.max.mögl.Beschattung			408			190		
Red.Sonnenscheinwahrsch.			0,32			0,40		
Reduktion Betriebsdauer			0,91			0,91		
Reduktion Windrichtung			0,60			0,68		
Gesamte Reduktion			0,17			0,25		
Met.wahrsch.Beschattung			71			47		

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)

SHADOW - Kalender

Berechnung: 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_biliSchattenrezeptor: IO 07 - Stierwiese 7, 56291 Lingerhahn
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Voraussetzungen für Berechnung des Schattenwurfs

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Table with columns for months (Juli, August, September, Oktober, November, Dezember) and rows for days (1-31). Includes solar hours, reduction of operating time, and shading reduction data.

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Table with 4 columns: Tag im Monat, Sonnenaufgang (SS:MM), Sonnenuntergang (SS:MM), Minuten mit Schatten; and 4 columns: Zeitpunkt (SS:MM) Schattenanfang, Zeitpunkt (SS:MM) Schatteneende, (WEA mit erstem Schatten), (WEA mit letztem Schatten).

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bil**Schattenrezeptor:** IO 08 - Hauptstraße 2, 56291 Lingerhahn  
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	June	
1	08:29   16:38	08:05   17:23	07:16   18:11	08:01 (Li_W334)   07:09   18:11 (Li_W334)   20:01		06:08   20:48	
2	08:29   16:39	08:04   17:24	07:14   18:12	08:05 (Li_W334)   07:07   18:12 (Li_W334)   20:02		06:06   20:49	
3	08:29   16:40	08:03   17:26	07:12   18:14	08:08 (Li_W334)   07:05   18:14 (Li_W334)   20:04		06:04   20:51	
4	08:29   16:41	08:01   17:28	07:09   18:16			06:03   20:52	
5	08:29   16:42	08:00   17:30	07:07   18:17			06:01   20:54	
6	08:29   16:43	07:58   17:31	07:05   18:19	07:35 (Li_W333)   06:58   18:19 (Li_W333)   20:09	07:25 (Li_W332)   05:59	05:23   21:30	
7	08:28   16:45	07:56   17:33	07:03   18:21	07:42 (Li_W333)   06:56   18:21 (Li_W333)   20:10	07:30 (Li_W332)   05:58	21:35   05:22	
8	08:28   16:46	07:55   17:35	07:01   18:22	07:32 (Li_W333)   06:54   18:22 (Li_W333)   20:12	07:22 (Li_W332)   05:57	05:22   21:37	
9	08:28   16:47	07:53   17:37	06:59   18:24	07:31 (Li_W333)   06:54   18:24 (Li_W333)   20:13	07:20 (Li_W332)   05:56	05:22   21:37	
10	08:27   16:48	07:51   17:42	06:57   18:29	07:47 (Li_W333)   06:50   18:29 (Li_W333)   20:15	07:19 (Li_W332)   05:53	05:21   21:38	
11	08:27   16:50	07:50   17:40	06:55   18:27	07:48 (Li_W333)   06:48   18:27 (Li_W333)   20:17	07:20 (Li_W332)   05:51	05:21   21:39	
12	08:26   16:51	07:48   17:42	06:53   18:29	07:49 (Li_W333)   06:45   18:29 (Li_W333)   20:18	07:17 (Li_W332)   05:50	05:21   21:40	
13	08:25   16:52	07:46   17:44	06:50   18:31	07:48 (Li_W333)   06:43   18:31 (Li_W333)   20:20	07:33 (Li_W332)   05:48	05:20   21:40	
14	08:25   16:54	07:45   17:45	06:48   18:32	07:48 (Li_W333)   06:41   18:32 (Li_W333)   20:21	07:32 (Li_W332)   05:47	05:20   21:41	
15	08:24   16:55	07:43   17:47	06:46   18:34	07:47 (Li_W333)   06:39   18:34 (Li_W333)   20:23	07:31 (Li_W332)   05:45	05:20   21:41	
16	08:23   16:57	07:41   17:49	06:44   18:35	07:46 (Li_W333)   06:37   18:35 (Li_W333)   20:24	07:30 (Li_W332)   05:44	05:20   21:42	
17	08:22   16:58	07:39   17:50	06:42   18:37	07:45 (Li_W333)   06:35   18:37 (Li_W333)   20:26	07:28 (Li_W332)   05:42	05:20   21:42	
18	08:22   17:00	07:37   17:52	06:40   18:39	07:44 (Li_W333)   06:33   18:39 (Li_W333)   20:28		05:41   21:43	
19	08:21   17:01	07:35   17:54	06:37   18:40	07:41 (Li_W333)   06:31   18:40 (Li_W333)   20:29	07:41 (Li_W332)   05:40	21:43   05:20	
20	08:20   17:03	7   08:01 (Li_W334)   17:56   12   08:11 (Li_W334)   18:42   11   07:38 (WEA 01)   20:29	06:35   18:42   11   07:36 (WEA 01)   20:31	07:25 (WEA 01)   06:29   11   07:32 (WEA 01)   20:32	05:39   21:16   21:43		
21	08:19   17:04	07:32   17:57	06:33   18:43	07:38 (WEA 01)   06:27   18:43 (Li_W334)   20:32	07:19 (Li_W332)   05:45	05:20   21:43	
22	08:18   17:06	07:30   17:59	06:31   18:45	07:36 (WEA 01)   06:25   18:45 (Li_W334)   20:34	07:19 (Li_W332)   05:44	05:20   21:44	
23	08:17   17:08	07:28   18:01	06:29   18:47	06:53 (Li_W348)   06:23   18:47 (Li_W348)   20:35	07:21 (Li_W332)   05:44	05:21   21:44	
24	08:16   17:09	07:26   18:02	06:26   18:48	07:02 (Li_W348)   06:21   18:48 (Li_W348)   20:37	07:20 (Li_W332)   05:43	05:21   21:44	
25	08:14   17:11	07:24   18:04	06:24   18:50	07:04 (Li_W348)   06:19   18:50 (Li_W348)   20:39	07:19 (Li_W332)   05:42	05:21   21:44	
26	08:13   17:13	07:22   18:06	06:22   18:51	06:51 (Li_W348)   06:17   18:51 (Li_W348)   20:40	07:18 (Li_W332)   05:41	05:22   21:44	
27	08:12   17:14	07:20   18:07	06:20   18:53	07:05 (Li_W348)   06:15   18:53 (Li_W348)   20:42	07:17 (Li_W332)   05:40	05:22   21:44	
28	08:11   17:16	07:18   18:09	06:18   18:54	07:04 (Li_W348)   06:14   18:54 (Li_W348)   20:43	07:16 (Li_W332)   05:39	05:22   21:44	
29	08:10   17:18		07:15   19:56	07:03 (Li_W348)   06:12   19:56 (Li_W348)   20:45	07:15 (Li_W332)   05:38	05:23   21:44	
30	08:08   17:19		07:13   19:58	08:02 (Li_W348)   06:10   19:58 (Li_W348)   20:46	07:14 (Li_W332)   05:37	05:23   21:44	
31	08:07   17:21		07:11   19:59	07:51 (Li_W348)   06:08   19:59 (Li_W348)   20:46	08:01 (Li_W348)   06:07	05:27   21:28	
	Sonneneinstrahlung	267	281	368	413	478	489
	astr.max.mögl.Beschattung			412	139		
	Red.Sonneneinstrahlung		145	0,32	0,40		
	Reduktion Betriebsdauer		0,29	0,91	0,91		
	Reduktion Windrichtung		0,91	0,59	0,68		
	Gesamte Reduktion		0,55	0,17	0,24		
	Met.wahrsch.Beschattung		0,14	70	34		

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang (WEA mit erstem Schatten)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende (WEA mit letztem Schatten)
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SHADOW - Kalender

Berechnung: 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bil Schattenrezeptor: IO 08 - Hauptstraße 2, 56291 Lingerhahn
Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor
N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

Table with columns for months (Juli, August, September, Oktober, November, Dezember) and rows for each day (1-31) showing sunrise/sunset times and shadow data. Includes summary rows for 'Sonneneinstunden', 'astr.max.mögl.Beschattung', etc.

Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):

Summary table with columns: Tag im Monat, Sonnenaufgang (SS:MM), Sonnenuntergang (SS:MM), Minuten mit Schatten, Zeitpunkt (SS:MM) Schattenanfang, Zeitpunkt (SS:MM) Schattenende, (WEA mit erstem Schatten), (WEA mit letztem Schatten)

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**Schattenrezeptor:** IO 09 - Campingplatz Am Mühlenteich, 56291 Lingerhahn  
**Voraussetzungen für Berechnung des Schattenwurfs** Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	June
1	08:29 16:38	09:20 (Li_W334)   08:05 09:39 (Li_W334)   17:23	09:23 (Li_W333)   07:16 09:39 (Li_W333)   18:11	08:04 (Li_W348)   07:09 08:20 (Li_W348)   20:01	06:08 20:48	05:26 21:30
2	08:29 16:39	09:20 (Li_W334)   08:04 09:38 (Li_W334)   17:24	09:26 (Li_W333)   07:14 09:38 (Li_W333)   18:12	08:05 (Li_W348)   07:07 08:19 (Li_W348)   20:02	06:06 20:49	05:26 21:31
3	08:29 16:40	09:20 (Li_W334)   08:03 09:39 (Li_W334)   17:26	09:29 (Li_W333)   07:11 09:35 (Li_W333)   18:14	08:06 (Li_W348)   07:05 08:17 (Li_W348)   20:04	06:04 20:51	05:25 21:32
4	08:29 16:41	09:21 (Li_W334)   08:01 09:40 (Li_W334)   17:28	07:09 18:16	08:09 (Li_W348)   07:02 08:14 (Li_W348)   20:06	06:03 20:52	05:24 21:33
5	08:29 16:42	09:22 (Li_W334)   07:59 09:41 (Li_W334)   17:30	07:07 18:17	07:00 20:07	06:01 20:54	05:24 21:34
6	08:29 16:43	09:21 (Li_W334)   07:58 09:41 (Li_W334)   17:31	07:05 18:19	06:58 20:09	05:59 20:56	05:23 21:35
7	08:28 16:44	09:22 (Li_W334)   07:56 09:42 (Li_W334)   17:33	07:03 18:21	07:45 (Li_W332)   06:56 07:50 (Li_W332)   20:10	05:58 20:57	05:22 21:36
8	08:28 16:46	09:22 (Li_W333)   07:55 09:42 (Li_W334)   17:35	07:01 18:22	06:54 20:12	05:56 20:59	05:22 21:37
9	08:28 16:47	09:21 (Li_W333)   07:53 09:43 (Li_W334)   17:37	08:35 (WEA 01)   06:59 08:43 (WEA 01)   18:24	07:40 (Li_W332)   06:52 07:55 (Li_W332)   20:13	05:54 21:00	05:22 21:37
10	08:27 16:48	09:20 (Li_W333)   07:51 09:43 (Li_W334)   17:38	8 08:45 (WEA 01)   18:26	15 07:38 (Li_W332)   06:50 07:56 (Li_W332)   20:15	05:53 21:02	05:21 21:38
11	08:27 16:50	09:19 (Li_W333)   07:50 09:43 (Li_W334)   17:40	13 08:30 (WEA 01)   06:55 08:47 (WEA 01)   18:27	18 07:37 (Li_W332)   06:48 07:57 (Li_W332)   20:17	06:48 21:03	05:21 21:39
12	08:26 16:51	09:19 (Li_W333)   07:48 09:43 (Li_W334)   17:42	17 08:30 (WEA 01)   06:52 08:49 (WEA 01)   18:29	20 07:36 (Li_W332)   06:45 07:56 (Li_W332)   20:18	05:50 21:04	05:21 21:40
13	08:25 16:52	09:18 (Li_W333)   07:46 09:43 (Li_W334)   17:44	19 08:29 (WEA 01)   06:50 08:50 (WEA 01)   18:31	21 07:36 (Li_W332)   06:43 07:57 (Li_W332)   20:20	05:48 21:06	05:20 21:40
14	08:25 16:54	09:18 (Li_W333)   07:44 09:43 (Li_W334)   17:45	21 08:28 (WEA 01)   06:48 08:50 (WEA 01)   18:32	21 07:35 (Li_W332)   06:41 07:57 (Li_W332)   20:21	05:47 21:07	05:20 21:41
15	08:24 16:55	09:17 (Li_W333)   07:43 09:43 (Li_W334)   17:47	22 08:28 (WEA 01)   06:46 08:50 (WEA 01)   18:34	22 07:36 (Li_W332)   06:39 07:56 (Li_W332)   20:23	05:45 21:09	05:20 21:41
16	08:23 16:57	09:17 (Li_W333)   07:41 09:43 (Li_W334)   17:49	22 08:27 (WEA 01)   06:44 08:51 (WEA 01)   18:35	20 07:36 (Li_W332)   06:37 07:56 (Li_W332)   20:24	05:44 21:10	05:20 21:42
17	08:22 16:58	09:17 (Li_W333)   07:39 09:43 (Li_W334)   17:50	24 08:27 (WEA 01)   06:42 08:51 (WEA 01)   18:37	20 07:37 (Li_W332)   06:35 07:55 (Li_W332)   20:26	05:42 21:12	05:20 21:42
18	08:22 17:00	09:17 (Li_W333)   07:37 09:42 (Li_W334)   17:52	23 08:27 (WEA 01)   06:39 08:50 (WEA 01)   18:39	18 07:37 (Li_W332)   06:33 07:52 (Li_W332)   20:28	05:41 21:13	05:20 21:43
19	08:21 17:01	09:17 (Li_W333)   07:35 09:41 (Li_W334)   17:54	23 08:27 (WEA 01)   06:37 08:50 (WEA 01)   18:40	15 07:38 (Li_W332)   06:31 07:50 (Li_W332)   20:29	05:40 21:14	05:20 21:43
20	08:20 17:03	09:17 (Li_W333)   07:33 09:41 (Li_W333)   17:56	23 08:27 (WEA 01)   06:35 08:49 (WEA 01)   18:42	12 07:42 (Li_W332)   06:29 07:47 (Li_W332)   20:31	05:39 21:16	05:20 21:43
21	08:19 17:04	09:17 (Li_W333)   07:31 09:42 (Li_W333)   17:57	22 08:09 (Li_W348)   06:33 08:49 (WEA 01)   18:43	5 06:27 20:32	05:37 21:17	05:20 21:43
22	08:18 17:06	09:17 (Li_W333)   07:30 09:42 (Li_W333)   17:59	29 08:07 (Li_W348)   06:31 08:47 (WEA 01)   18:45	06:25 20:34	05:36 21:18	05:20 21:44
23	08:17 17:08	09:18 (Li_W333)   07:28 09:43 (Li_W333)   18:01	30 08:05 (Li_W348)   06:29 08:46 (WEA 01)   18:47	06:23 20:35	05:35 21:20	05:21 21:44
24	08:16 17:09	09:17 (Li_W333)   07:26 09:42 (Li_W333)   18:02	31 08:04 (Li_W348)   06:26 08:44 (WEA 01)   18:48	06:21 20:37	05:34 21:21	05:21 21:44
25	08:14 17:11	09:18 (Li_W333)   07:24 09:43 (Li_W333)   18:04	29 08:04 (Li_W348)   06:24 08:39 (WEA 01)   18:50	06:19 20:39	05:33 21:22	05:21 21:44
26	08:13 17:13	09:19 (Li_W333)   07:22 09:43 (Li_W333)   18:06	19 08:03 (Li_W348)   06:22 08:21 (Li_W348)   18:51	06:17 20:40	05:32 21:23	05:22 21:44
27	08:12 17:14	09:19 (Li_W333)   07:20 09:43 (Li_W333)   18:07	18 08:03 (Li_W348)   06:20 08:21 (Li_W348)   18:53	06:15 20:42	05:31 21:25	05:22 21:44
28	08:11 17:16	09:19 (Li_W333)   07:18 09:42 (Li_W333)   18:09	18 08:04 (Li_W348)   06:18 08:21 (Li_W348)   18:54	06:13 20:43	05:30 21:26	05:22 21:44
29	08:10 17:18	09:21 (Li_W333)   07:16 09:42 (Li_W333)   18:07	17 07:15 19:56	06:12 20:45	05:29 21:27	05:23 21:44
30	08:08 17:19	09:21 (Li_W333)   07:14 09:41 (Li_W333)   18:05	07:13 19:58	06:10 20:46	05:28 21:28	05:23 21:44
31	08:07 17:21	09:23 (Li_W333)   07:12 09:41 (Li_W333)   18:03	07:11 19:59	05:27 21:29	05:27 21:29	21:44
Sonneneinstunden	267	281	368	413	478	489
astr.max.mögl.Beschattung	703	463	268			
Red.Sonneneinstunden	0,17	0,29	0,32			
Reduktion Betriebsdauer	0,91	0,91	0,91			
Reduktion Windrichtung	0,47	0,53	0,56			
Gesamte Reduktion	0,07	0,14	0,16			
Met.wahrsch.Beschattung	51	63	43			

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattenende
			(WEA mit letztem Schatten)

**SHADOW - Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**Schattenrezeptor:** IO 09 - Campingplatz Am Mühlenteich, 56291 Lingerhahn  
**Voraussetzungen für Berechnung des Schattenwurfs** Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:24 21:43	05:58 21:14	06:44 20:16	07:29 19:11	08:16 (Li_W332) 17:08	08:02 (WEA 01) 16:31
2	05:25 21:43	05:59 21:13	06:45 20:14	07:30 19:08	08:15 (Li_W332) 17:07	08:05 (WEA 01) 16:31
3	05:25 21:43	06:01 21:11	06:47 20:12	07:32 19:06	08:16 (Li_W332) 17:05	08:09 16:30
4	05:26 21:42	06:02 21:10	06:48 20:10	07:33 19:04	08:17 (Li_W332) 17:03	08:10 16:30
5	05:27 21:42	06:03 21:08	06:50 20:08	07:35 19:02	08:18 (Li_W332) 17:02	08:11 16:29
6	05:28 21:42	06:05 21:06	06:51 20:06	07:37 19:00	08:20 (Li_W332) 17:00	08:13 16:29
7	05:28 21:41	06:06 21:05	06:53 20:03	07:38 18:58	08:29 (Li_W332) 17:00	08:14 16:29
8	05:29 21:41	06:08 21:03	06:54 20:01	07:40 18:56	07:30 16:57	08:59 (Li_W333) 09:06 (Li_W333)
9	05:30 21:40	06:09 21:01	06:56 19:59	07:41 18:53	07:32 16:55	08:56 (Li_W333) 09:08 (Li_W333)
10	05:31 21:39	06:11 21:00	06:57 19:57	07:43 18:51	08:42 (Li_W348) 08:50 (Li_W348)	08:54 (Li_W333) 09:10 (Li_W333)
11	05:32 21:39	06:12 20:58	06:59 19:55	07:44 18:49	08:40 (Li_W348) 08:52 (Li_W348)	08:53 (Li_W333) 09:12 (Li_W333)
12	05:33 21:38	06:14 20:56	07:00 19:53	07:46 18:47	08:38 (Li_W348) 08:53 (Li_W348)	08:53 (Li_W333) 09:13 (Li_W333)
13	05:34 21:37	06:15 20:54	07:02 19:50	07:48 18:45	08:37 (Li_W348) 08:54 (Li_W348)	08:53 (Li_W333) 09:14 (Li_W333)
14	05:35 21:36	06:17 20:52	07:03 19:48	07:49 18:43	08:37 (Li_W348) 08:54 (Li_W348)	08:51 (Li_W333) 09:14 (Li_W333)
15	05:36 21:35	06:18 20:51	07:05 19:46	07:51 18:41	08:36 (Li_W348) 08:54 (Li_W348)	08:51 (Li_W333) 09:15 (Li_W333)
16	05:37 21:34	06:20 20:49	07:06 19:44	07:52 18:39	08:36 (Li_W348) 08:54 (Li_W348)	08:51 (Li_W333) 09:16 (Li_W333)
17	05:38 21:33	06:21 20:47	07:08 19:41	07:54 18:37	08:36 (Li_W348) 09:14 (WEA 01)	08:52 (Li_W333) 09:17 (Li_W333)
18	05:40 21:32	06:23 20:45	07:09 19:39	07:56 18:35	08:36 (Li_W348) 09:16 (WEA 01)	08:51 (Li_W333) 09:16 (Li_W333)
19	05:41 21:31	06:24 20:43	07:11 19:37	07:57 18:33	08:37 (Li_W348) 09:18 (WEA 01)	08:52 (Li_W333) 09:17 (Li_W333)
20	05:42 21:30	06:26 20:41	07:12 19:35	07:59 18:31	08:39 (Li_W348) 09:19 (WEA 01)	08:52 (Li_W333) 09:17 (Li_W333)
21	05:43 21:29	06:27 20:39	07:14 19:33	08:00 18:29	08:41 (Li_W348) 09:20 (WEA 01)	09:17 (Li_W333) 09:18 (Li_W333)
22	05:44 21:28	06:29 20:37	07:15 19:30	08:02 18:27	08:58 (WEA 01) 09:20 (WEA 01)	08:53 (Li_W333) 09:17 (Li_W333)
23	05:46 21:27	06:30 20:35	07:17 19:28	08:04 18:25	08:57 (WEA 01) 09:21 (WEA 01)	08:54 (Li_W333) 09:18 (Li_W334)
24	05:47 21:26	06:32 20:33	07:18 19:26	08:05 18:23	08:57 (WEA 01) 09:21 (WEA 01)	08:55 (Li_W333) 09:20 (Li_W334)
25	05:48 21:24	06:33 20:31	07:20 19:24	08:23 (Li_W332) 08:35 (Li_W332)	07:57 (WEA 01) 08:21 (WEA 01)	08:55 (Li_W333) 09:21 (Li_W334)
26	05:50 21:23	06:35 20:29	07:21 19:22	08:19 (Li_W332) 08:36 (Li_W332)	07:59 (WEA 01) 17:19	08:56 (Li_W333) 09:22 (Li_W334)
27	05:51 21:22	06:36 20:27	07:23 19:19	08:18 (Li_W332) 08:37 (Li_W332)	17:17	08:56 (Li_W333) 09:22 (Li_W334)
28	05:52 21:20	06:38 20:25	07:24 19:17	08:16 (Li_W332) 08:37 (Li_W332)	17:16	08:58 (Li_W333) 09:23 (Li_W334)
29	05:54 21:19	06:39 20:23	07:26 19:15	08:16 (Li_W332) 08:37 (Li_W332)	17:14	08:58 (Li_W333) 09:23 (Li_W334)
30	05:55 21:17	06:41 20:21	07:27 19:13	08:15 (Li_W332) 08:36 (Li_W332)	17:15	09:00 (Li_W333) 16:36
31	05:56 21:16	06:42 20:18		07:27 17:10	08:00 (WEA 01) 08:16 (WEA 01)	08:29 16:37
Sonnenscheinstunden	493	449	380	334	273	253
astr.max.mögl.Beschattung			123	561	538	563
Red.Sonnenscheinwahrsch.			0,40	0,26	0,20	0,15
Reduktion Betriebsdauer			0,91	0,91	0,91	0,91
Reduktion Windrichtung			0,56	0,54	0,47	0,48
Gesamte Reduktion			0,20	0,12	0,08	0,06
Met.wahrsch.Beschattung			25	69	45	36

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

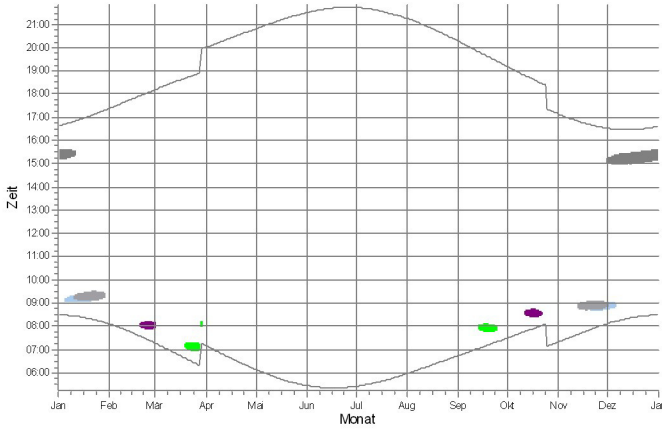
Tag im Monat	Sonnenaufgang (SS:MM)	Zeitpunkt (SS:MM) Schattenanfang	(WEA mit erstem Schatten)
	Sonnenuntergang (SS:MM)	Minuten mit Schatten	Zeitpunkt (SS:MM) Schattende
			(WEA mit letztem Schatten)



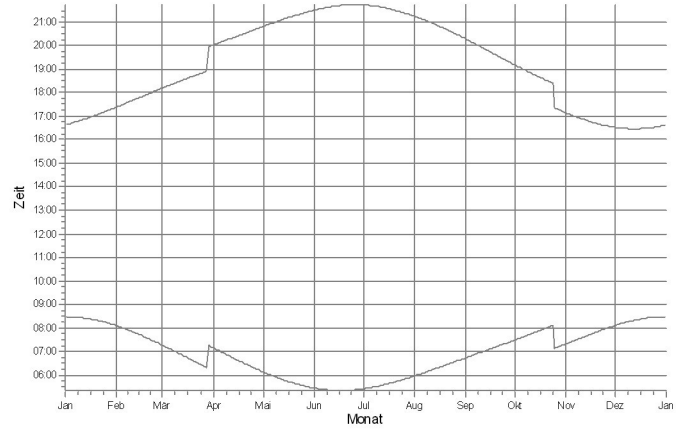
**SHADOW - Grafischer Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili

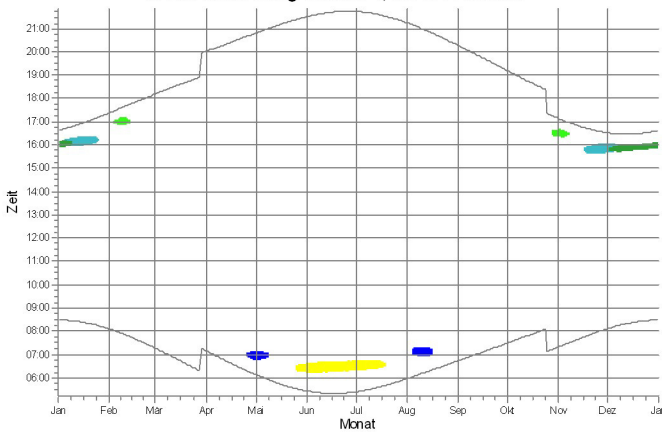
IO 01: Nenzhäuserhof 2, 56291 Pflzfeld



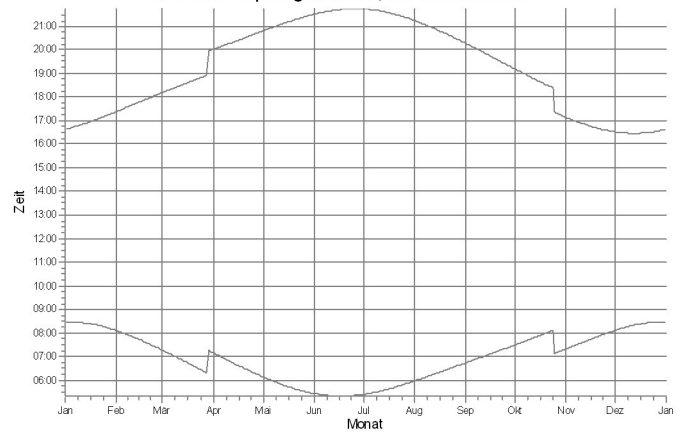
IO 02: Simmerbach, 56291 Laudert



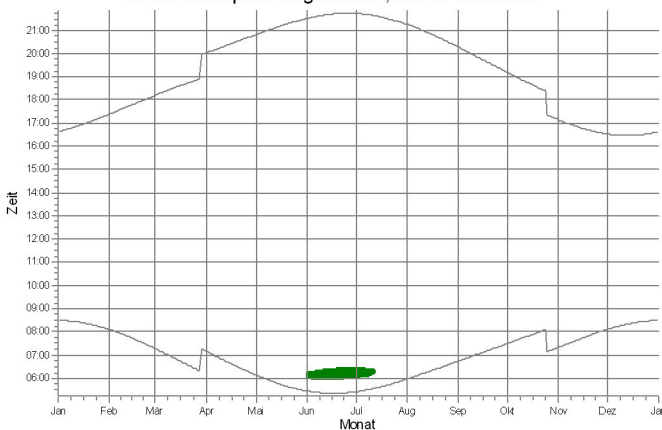
IO 03: Horst-Uhlig-Straße 4, 56291 Laudert



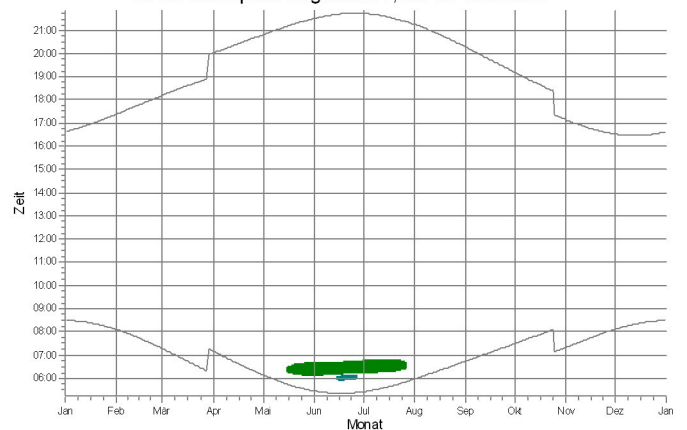
IO 04: Im Hopfengarten 11, 56291 Maisborn



IO 05: Wohnplatz Sägewerk 2, 56291 Maisborn



IO 06: Wohnplatz Sägewerk 1, 56291 Maisborn



WEA

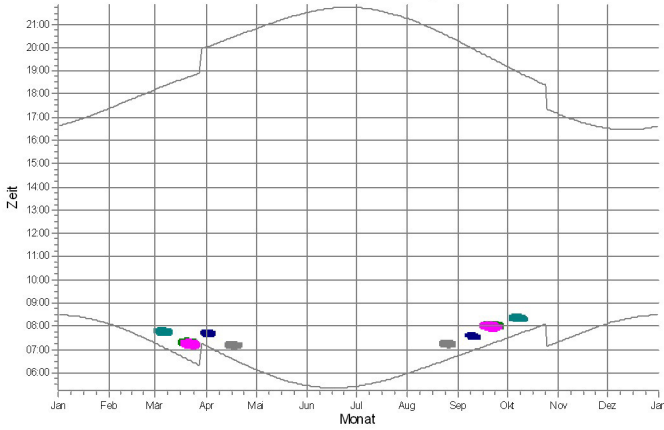
- WEA 01: VESTAS V150-5.6MW 5600 150.0 IO! NH: 166,0 m (Ges:241,0 m) (493)
- Laudert\_W431: ENERCON E-101 3050 101.0 IO! NH: 135,4 m (Ges:185,9 m) (752)
- Laudert\_W537: ENERCON E-101 3050 101.0 IO! NH: 135,4 m (Ges:185,9 m) (753)
- Li\_W332: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (764)
- Li\_W334: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (766)
- Oberwe III\_W511: REpower 3.4M104 3400 104.0 IO! NH: 128,0 m (Ges:180,0 m) (763)

- Oberwe III\_W513: REpower 3.4M104 3400 104.0 IO! NH: 128,0 m (Ges:180,0 m) (760)
- Oberwe\_W322: ENERCON E-82 2300 82.0 IO! NH: 138,4 m (Ges:179,4 m) (755)
- Oberwe\_W323: ENERCON E-82 2300 82.0 IO! NH: 138,4 m (Ges:179,4 m) (756)
- Ri\_W435: REpower 3.2M114 3170 114.0 IO! NH: 143,0 m (Ges:200,0 m) (778)
- Ri\_W436: REpower 3.2M114 3170 114.0 IO! NH: 143,0 m (Ges:200,0 m) (780)
- Ri\_W437: REpower 3.2M114 3170 114.0 IO! NH: 143,0 m (Ges:200,0 m) (779)

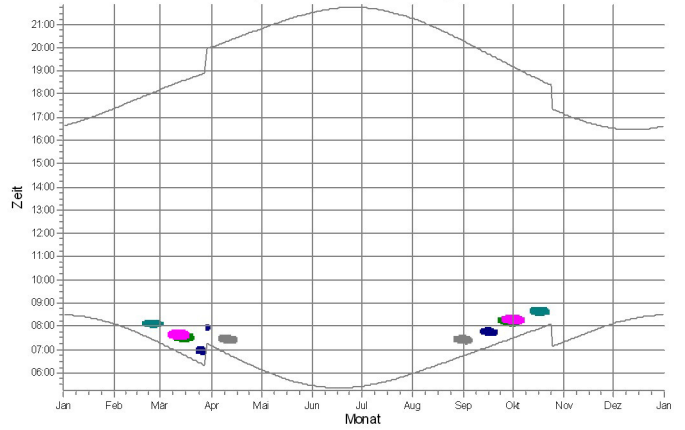
**SHADOW - Grafischer Kalender**

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili

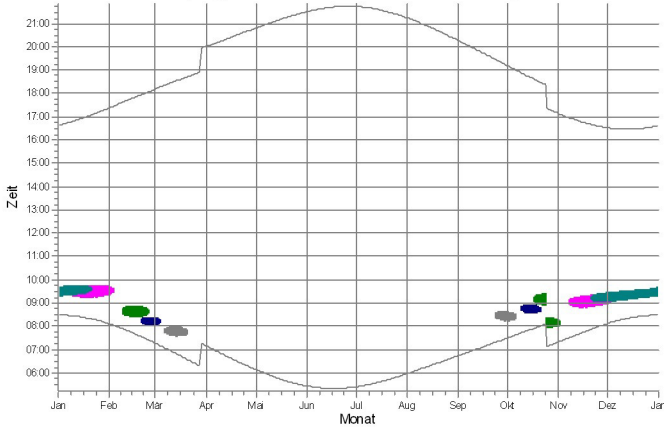
IO 07: Stierwiese 7, 56291 Lingerhahn



IO 08: Hauptstraße 2, 56291 Lingerhahn



IO 09: Campingplatz Am Mühlenteich, 56291 Lingerhahn



WEA

- WEA 01: VESTAS V150-5.6MW 5600 150.0 IO! NH: 166,0 m (Ges:241,0 m) (493)
- Li\_W332: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (764)
- Li\_W333: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (765)

- Li\_W334: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (766)
- Li\_W348: REpower MM 92 Evolution 2050 92.5 IO! NH: 100,0 m (Ges:146,3 m) (767)

## SHADOW - Kalender pro WEA

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**WEA:** WEA 01 - VESTAS V150-5.6MW 5600 150.0 !O! NH: 166,0 m (Ges:241,0 m) (493)  
Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]

**Voraussetzungen für Berechnung des Schattenwurfs**

Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	Januar	Februar	März	April	Mai	Juni
1	08:29 16:38	08:05 17:23	07:16 18:11	07:09 20:01	06:08 20:48	05:26 21:30
2	08:29 16:39	08:04 17:24	07:13 18:12	07:07 20:02	06:06 20:49	05:25 21:31
3	08:29 16:40	08:02 17:26	07:11 18:14	07:05 20:04	06:04 20:51	05:25 21:32
4	08:29 16:41	08:01 17:28	07:09 18:16	07:02 20:05	06:03 20:52	05:24 21:33
5	08:29 16:42	07:59 17:30	07:07 18:17	07:00 20:07	06:01 20:54	05:23 21:34
6	08:29 16:43	07:58 17:31	07:05 18:19	06:58 20:09	05:59 20:55	05:23 21:35
7	08:28 16:44	07:56 17:33	07:03 18:21	06:56 20:10	05:58 20:57	05:22 21:36
8	08:28 16:46	07:55 17:35	07:01 18:22	06:54 20:12	05:56 20:58	05:22 21:37
9	08:27 16:47	07:53 17:37	06:59 18:24	07:29-07:39/10	06:52 20:13	05:22 21:37
10	08:27 16:48	07:51 17:38	06:57 18:26	07:26-07:41/15	06:50 20:15	05:21 21:38
11	08:26 16:50	07:50 17:40	06:55 18:27	07:25-07:42/17	06:47 20:16	05:21 21:39
12	08:26 16:51	07:48 17:42	06:52 18:29	07:23-07:42/19	06:45 20:18	05:21 21:39
13	08:25 16:52	07:46 17:43	06:50 18:30	07:22-07:42/20	06:43 20:20	05:20 21:40
14	08:25 16:54	07:44 17:45	06:48 18:32	07:22-07:42/20	06:41 20:21	05:20 21:41
15	08:24 16:55	07:43 17:47	06:46 18:34	07:15-07:42/27	06:39 20:23	05:20 21:41
16	08:23 16:57	07:41 17:49	06:44 18:35	07:12-07:42/30	06:37 20:24	05:20 21:42
17	08:22 16:58	07:39 17:50	06:42 18:37	07:11-07:41/30	06:35 20:26	05:20 21:42
18	08:22 17:00	07:37 17:52	06:39 18:39	07:09-07:39/30	06:33 20:27	05:20 21:42
19	08:21 17:01	07:35 17:54	06:37 18:40	07:08-07:38/30	06:31 20:29	05:20 21:43
20	08:20 17:03	07:33 17:55	06:35 18:42	07:07-07:36/29	06:29 20:31	05:20 21:43
21	08:19 17:04	07:31 17:57	06:33 18:43	07:28-07:32/4	06:27 20:32	05:20 21:43
22	08:18 17:06	07:29 17:59	06:31 18:45	07:07-07:26/19	06:25 20:34	05:20 21:44
23	08:17 17:08	07:28 18:01	06:29 18:46	07:07-07:25/18	06:23 20:35	05:20 21:44
24	08:16 17:09	07:26 18:02	06:26 18:48	07:07-07:24/17	06:21 20:37	05:21 21:44
25	08:14 17:11	07:24 18:04	06:24 18:50	07:08-07:23/15	06:19 20:38	05:21 21:44
26	08:13 17:13	07:22 18:06	06:22 18:51	07:10-07:21/11	06:17 20:40	05:21 21:44
27	08:12 17:14	07:20 18:07	06:20 18:53	07:14-07:16/2	06:15 20:42	05:22 21:44
28	08:11 17:16	07:18 18:09	06:18 18:54		06:13 20:43	05:22 21:44
29	08:09 17:18		07:15 19:56		06:12 20:45	05:23 21:44
30	08:08 17:19		07:13 19:58		06:10 20:46	05:23 21:44
31	08:07 17:21		07:11 19:59		05:27 21:29	06:10-06:38/28
Sonnenscheinstunden	267	281	368	413	478	489
Anzahl Minuten mit Schatten	0	307	383	0	353	1198

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat    Sonnenaufgang (SS:MM)    Zeitpunkt (SS:MM)    Schattenanfang-Zeitpunkt (SS:MM)    Schattenende/Minuten mit Schatten  
 Sonnenuntergang (SS:MM)    Zeitpunkt (SS:MM)    Schattenanfang-Zeitpunkt (SS:MM)    Schattenende/Minuten mit Schatten

## SHADOW - Kalender pro WEA

**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili**WEA:** WEA 01 - VESTAS V150-5.6MW 5600 150.0 !O! NH: 166,0 m (Ges:241,0 m) (493)

### Voraussetzungen für Berechnung des Schattenwurfs

Sonnenscheinwahrscheinlichkeit S (Mittlere tägliche Sonnenstunden) [GEISENHEIM]  
Jan Feb Mär Apr Mai Jun Jul Aug Sep Okt Nov Dez  
1,48 2,93 3,80 5,50 6,94 6,23 7,34 6,96 5,12 2,77 1,83 1,21

Betriebsdauer je Sektor

N NNO ONO O OSO SSO S SSW WSW W WNW NNW Summe  
504 532 792 624 358 289 292 949 1.816 918 488 428 7.989  
Startwindgeschwindigkeit: Startwindgeschw. aus Leistungskennlinie

	July	August	September	Oktober	November	Dezember
1	05:24 06:03-06:44/41 21:43	05:58 21:14	06:44 20:16	07:29 08:03-08:22/19 19:11	07:19 08:02-08:15/13 17:08	08:06 16:31
2	05:25 06:04-06:44/40 21:43	05:59 21:13	06:45 20:14	07:30 08:02-08:20/18 19:08	07:20 08:05-08:12/7 17:07	08:07 16:31
3	05:25 06:04-06:44/40 21:43	06:01 21:11	06:47 20:12	07:32 08:04-08:19/15 19:06	07:22 17:05	08:09 16:30
4	05:26 06:05-06:44/39 21:42	06:02 21:10	06:48 20:10	07:33 08:05-08:18/13 19:04	07:24 17:03	08:10 16:30
5	05:27 06:06-06:45/39 21:42	06:03 21:08	06:50 20:08	07:35 08:08-08:14/6 19:02	07:25 17:02	08:11 16:29
6	05:28 06:05-06:44/39 21:41	06:05 21:06	06:51 20:06	07:36 19:00	07:27 17:00	08:13 16:29
7	05:28 06:06-06:45/39 21:41	06:06 21:05	06:52 20:03	07:38 18:58	07:29 16:58	08:14 16:29
8	05:29 06:07-06:45/38 21:40	06:08 21:03	06:54 20:01	07:40 18:55	07:30 16:57	08:15 16:28
9	05:30 06:09-06:46/37 21:40	06:09 21:01	06:55 19:59	07:41 18:53	07:32 16:55	08:16 16:28
10	05:31 06:10-06:46/36 21:39	06:11 21:00	06:57 19:57	07:43 18:51	07:34 16:54	08:17 16:28
11	05:32 06:11-06:46/35 21:38	06:12 20:58	06:58 19:55	07:44 18:49	07:35 16:52	08:18 16:28
12	05:33 06:14-06:46/32 21:38	06:14 20:56	07:00 19:52	07:46 18:47	07:37 16:51	08:19 16:28
13	05:34 06:18-06:46/28 21:37	06:15 20:54	07:01 19:50	07:47 18:45	07:38 16:50	08:20 16:28
14	05:35 06:19-06:46/27 21:36	06:17 20:52	07:03 19:48	07:49 18:43	07:40 16:48	08:21 16:28
15	05:36 06:19-06:46/27 21:35	06:18 20:50	07:04 19:46	07:51 18:41	07:42 16:47	08:22 16:28
16	05:37 06:19-06:46/27 21:34	06:20 20:49	07:06 19:44	07:52 18:39	07:43 16:46	08:23 16:28
17	05:38 06:19-06:46/27 21:33	06:21 20:47	07:07 07:59-08:09/10 19:41	07:54 09:06-09:14/8 18:37	07:45 16:44	08:23 16:28
18	05:40 06:20-06:46/26 21:32	06:23 20:45	07:09 07:56-08:10/14 19:39	07:55 09:03-09:16/13 18:35	07:47 16:43	08:24 16:29
19	05:41 06:20-06:45/25 21:31	06:24 20:43	07:10 07:55-08:11/16 19:37	07:57 09:01-09:18/17 18:33	07:48 16:42	08:25 16:29
20	05:42 06:20-06:45/25 21:30	06:26 20:41	07:12 07:53-08:11/18 19:35	07:59 09:00-09:19/19 18:31	07:50 16:41	08:25 16:29
21	05:43 06:21-06:44/23 21:29	06:27 20:39	07:13 07:53-08:12/19 19:33	08:00 08:59-09:20/21 18:29	07:51 16:40	08:26 16:30
22	05:44 06:21-06:44/23 21:28	06:29 20:37	07:15 07:52-08:11/19 19:30	08:02 08:58-09:20/22 18:27	07:53 16:39	08:27 16:30
23	05:46 06:23-06:44/21 21:27	06:30 20:35	07:16 07:52-08:20/28 19:28	08:04 08:57-09:21/24 18:25	07:54 16:38	08:27 16:31
24	05:47 06:24-06:43/19 21:25	06:32 20:33	07:18 07:51-08:21/30 19:26	08:05 08:57-09:21/24 18:23	07:56 16:37	08:28 16:31
25	05:48 06:25-06:41/16 21:24	06:33 20:31	07:20 07:52-08:23/31 19:24	07:07 07:57-08:21/24 17:21	07:58 16:36	08:28 16:32
26	05:50 06:26-06:40/14 21:23	06:35 20:29	07:21 07:52-08:23/31 19:22	07:09 07:57-08:20/23 17:19	07:59 16:35	08:28 16:32
27	05:51 06:29-06:38/9 21:22	06:36 20:27	07:23 07:53-08:23/30 19:19	07:10 07:57-08:20/23 17:17	08:00 16:34	08:29 16:33
28	05:52 21:20	06:38 20:25	07:24 07:55-08:23/28 19:17	07:12 07:58-08:20/22 17:15	08:02 16:33	08:29 16:34
29	05:54 21:19	06:39 20:23	07:26 08:03-08:23/20 19:15	07:14 07:59-08:19/20 17:14	08:03 16:33	08:29 16:35
30	05:55 21:17	06:41 20:20	07:27 08:02-08:22/20 19:13	07:15 07:59-08:17/18 17:12	08:05 16:32	08:29 16:36
31	05:56 21:16	06:42 20:18		07:17 08:00-08:16/16 17:10		08:29 16:37
Sonneneinstrahlung	493	449	380	334	273	253
Anzahl Minuten mit Schatten	792	0	314	365	20	0

**Tabellen-Layout: Die Daten für jeden Tag sind in folgender Matrix wiedergegeben (Sommerzeit wie Bezugsjahr):**

Tag im Monat    Sonnenaufgang (SS:MM)    Zeitpunkt (SS:MM) Schattenanfang-Zeitpunkt (SS:MM)    Schattenende/Minuten mit Schatten  
 Sonnenuntergang (SS:MM)    Zeitpunkt (SS:MM) Schattenanfang-Zeitpunkt (SS:MM)    Schattenende/Minuten mit Schatten

Projekt:

## Laudert III

Lizenzierter Anwender:

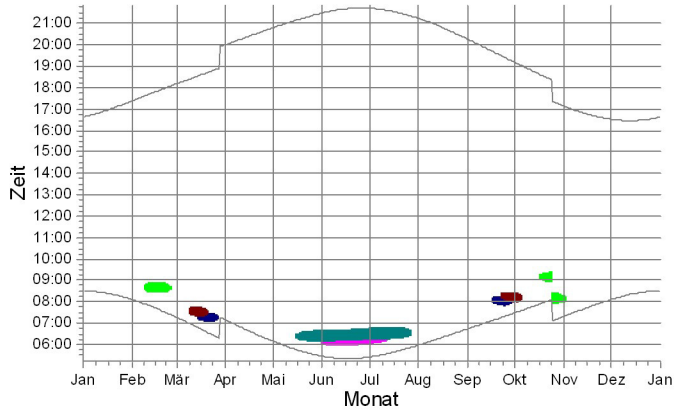
**Juwi AG**  
Energie-Allee 1  
DE-55286 Wörrstadt

Bianca Liersch / bianca.liersch@juwi.de  
Berechnet:  
30.04.2020 13:31/3.3.274




## SHADOW - Grafischer Kalender pro WEA



**Berechnung:** 200428\_Schatten\_GB\_Laudert III\_1xV150-5.6\_NH166\_bili

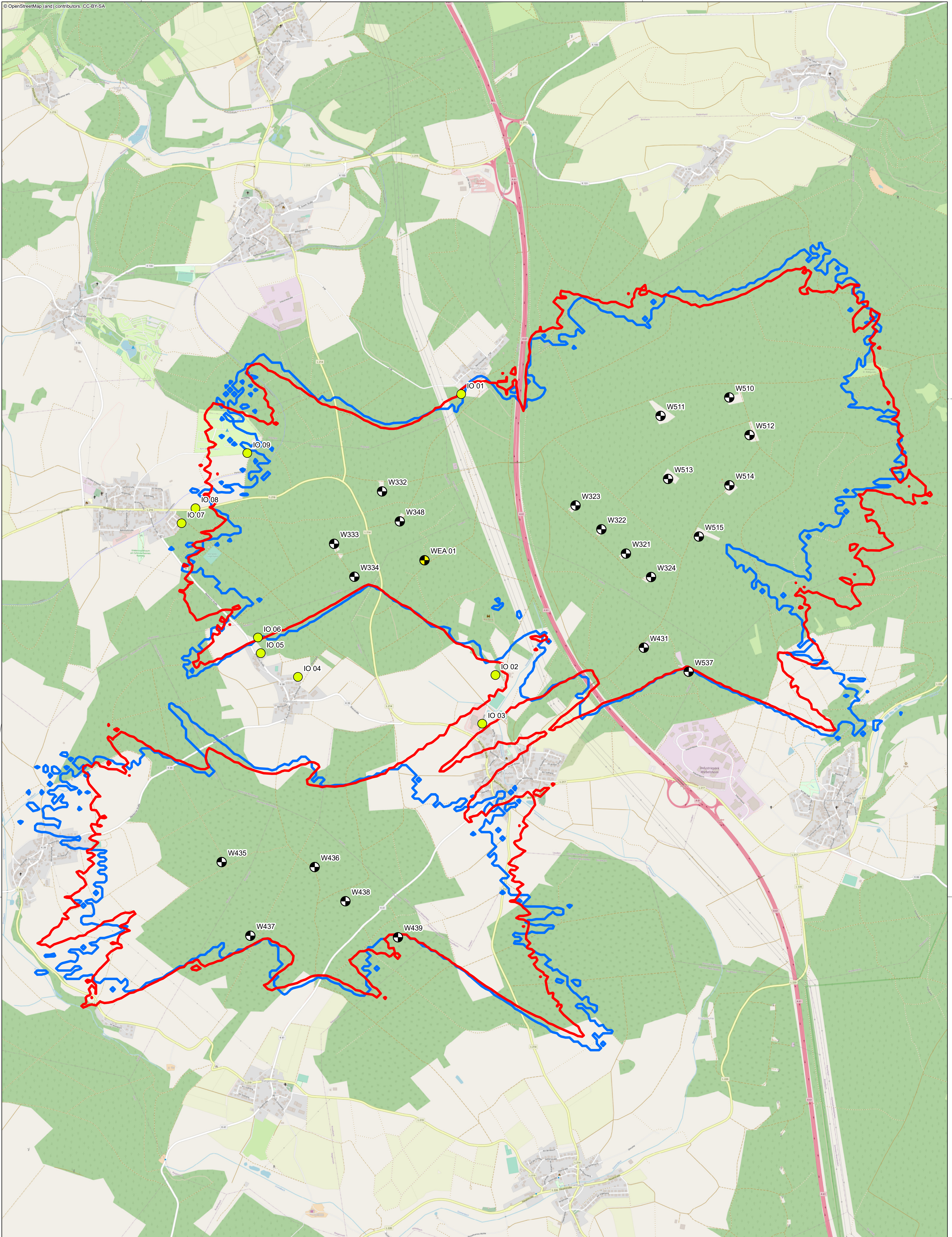
WEA 01: VESTAS V150-5.6MW 5600 150.0 !O! NH: 166,0 m (Ges:241,0 m) (493)



### Schattenrezeptoren

 IO 05: Wohnplatz Sägewerk 2, 56291 Maisborn  
 IO 06: Wohnplatz Sägewerk 1, 56291 Maisborn  
 IO 07: Stierwiese 7, 56291 Lingerhahn

 IO 08: Hauptstraße 2, 56291 Lingerhahn  
 IO 09: Campingplatz Am Mühlenteich, 56291 Lingerhahn



Laudert III		201029_Schatten_GB_Laudert III_1xV150-5.6_NH166_bill	
WEA juwi Planung	WEA juwi Bestand	 Merkfeld bei unzureichendem Ausblick auf A1: 1:12.000	
Schattenrezeptor	30 Stunden/Jahr Astron.max.mögl.	bill 15.03.2021	
30 Minuten/Tag Astron.max.mögl.	 juwi AG Energie-Alex 1, 92086 Würzburg		